12-19-01

Rec'd PCT/PTO 11 DEC 2001

FORM PTO-1390 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C 371

ATTORNEY'S DOCKET NUMBER: 2101.GLE.PT

U.S. APPLICATION NO. (If known, see 37 CFR 1.5): 10/018455

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/EP00/06373	6 July 2000	9 July 1999

TITLE OF INVENTION

SCREW CONNECTION FOR HINGE PARTS

APPLICANT(S) FOR DO/EO/US

Beck, Klaus; and Wagner, Reiner

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.
4. ☒ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. ☒ is attached hereto (required only if not communicated by the International Bureau).
   b. ☐ has been communicated by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
   a. ☒ is attached hereto.
   b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)).
   a. ☒ are attached hereto (required only if not communicated by the International Bureau).
   b. ☐ have been communicated by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☐ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☒ An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A FIRST preliminary amendment.
14. ☐ A SECOND or SUBSEQUENT preliminary amendment.
15. ☐ A substitute specification.
16. ☐ A change of power of attorney and/or address letter.
17. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
18. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
19. ☐ A second copy of the English translation of the international application under 35 U.S.C. 154(d)(4).
20. ☒ Other items or information:
    1) Certificate of Mailing Under 37 USC Section 1.10
    2) Return Postcard

531 Rec'd PCT/PTO 11 DEC 2001

U.S. APPLICATION NO. (if known, see 37 CFR 1.5)	INTERNATIONAL APPLICATION NO	ATTORNEY'S DOCKET NUMBER
10/018465		

21. ☐ The following fees are submitted:	CALCULATIONS	PTO USE ONLY
BASIC NATIONAL FEE (37 CFR 1.492 (a)(1) - (5)):		
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO **$1040.00**		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO. **$890.00**		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO **$740.00**		
International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4). **$710.00**		
International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4). **$100.00**		
ENTER APPROPRIATE BASIC FEE AMOUNT =	$890.00	
Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(e)).	$	

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	**35-20 =**	**15**	**X $18.00**	$270.00	
Independent claims	**-3 =**		**X $84.00**	$	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			**+ $280.00**	$	
			TOTAL OF ABOVE CALCULATIONS =	$1160.00	
☐ Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by ½.			+	$	
			SUBTOTAL =	$	
Processing fee of **$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(f)).			+	$	
			TOTAL NATIONAL FEE =	$	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). **$40.00** per property			+	$	
			TOTAL FEES ENCLOSED =	$1160.00	
			Amount to be refunded:	$	
			charged:	$	

a. ☒ A credit card authorization in the amount of $ 1160.00 to cover the above fees is enclosed. 10/018455

b. ☐ Please charge my Deposit Account No. 50-0881 in the amount of $_____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge additional fees which may be required, or credit any overpayment to Deposit Account No. 50-0881. A duplicate copy of this sheet is enclosed.

d. ☐ Fees are to be charged to a credit car. **WARNING:** Information on this form may become public. **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO

Randall B Bateman
MORRISS, BATEMAN, O'BRYANT & COMPAGNI
5882 South 900 East, Suite 300
Salt Lake City, Utah 84121
(801) 685-2302 phone
(801) 685-2303 facsimile

SIGNATURE

Randall B. Bateman
NAME

37,774
REGISTRATION NUMBER

CERTIFICATE OF DEPOSIT UNDER 37 C.F.R. § 1.10

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail, postage prepaid, under 37 C.F.R. § 1.10 on the date indicated below and is addressed to Asst. Commissioner for Patents & Trademarks, Washington, D.C. 20231.

Randall B. Bateman

12 December 2001
Date

EXPRESS MAIL NO. EL 902855055 US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Klaus Beck
Serial Number:	10/018,455
Filed:	July 6, 2000
Group:	_____
Examiner:	_____
For:	Screw Connection for Hinge Parts
Attorney Docket:	2101.GLE.PT

Commissioner of Patents
and Trademarks
Washington, D. C. 20231

I hereby certify that this correspondence is being deposited with the United States Postal Service via First Class Mail addressed to: Commissioner of Patents and Trademarks, Washington, D.C. 20231 on 3-20-02 (Date of Deposit)

PRELIMINARY AMENDMENT

Dear Sir:

Please amend the above-referenced Application as follows:

IN THE SPECIFICATION:

On Page 1, prior to the heading "Description", please insert:

Related Applications

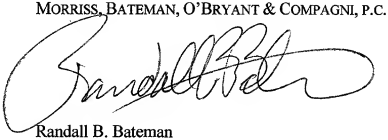
The present application is the U.S. National phase of PCT Application No. PCT/EP00/06373 filed July 6, 2000, which claims priority to German Pat. App. No. 19931837.9 filed July 9, 1999.

REMARKS

It is believed that the application is in condition for allowance. Should the Examiner determine that adverse action is necessary, it is requested that he contact Applicant's attorney, Randall B. Bateman, at (801) 478-0071 so that such matters may be resolved as expeditiously as possible. The Commissioner is hereby authorized to charge any amounts owing or to credit any overpayment to Account No. 50-0881.

Respectfully Submitted,

MORRISS, BATEMAN, O'BRYANT & COMPAGNI, P.C.



Randall B. Bateman
Reg. No. 37,774

5882 South 900 East, Suite 300
Salt Lake City, Utah 84121
Telephone (801) 566-6633
e-mail: bateman@mboclaw.com

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Klaus Beck et al.
Serial Number:	_____(National Stage of PCT/EP00/06373)
Filed:	6 July 2000
Group:	_____
Examiner:	_____
For:	SCREW CONNECTION FOR HINGE PARTS
Attorney Docket:	2101.GLE.PT

Commissioner of Patents
and Trademarks
Washington, D. C. 20231

I hereby certify that this correspondence is being deposited with the United States Postal Service via First Class Mail addressed to: Commissioner of Patents and Trademarks, Washington, D.C. 20231 on 11 Dec 2001
(Date of Deposit)

PRELIMINARY AMENDMENT

Dear Sir:

Prior to calculation of the filing fee and examination of the above-referenced application, please enter the following amendment.

In The CLAIMS.

Please cancel claim 1 through 14 and replace therefor, new claims 15 through 49 as set forth below.

15. (New) A screw connection for at least two hinge parts, comprising a screw configured for interconnecting the at least two hinge parts, wherein the hinge parts engage one inside the other and have an upper hinge lobe, a lower hinge lobe, and at least one middle hinge lobe, said screw having a screw head and a screw shank that extends through a first through opening in the upper hinge lobe and extends through a second through opening in the middle hinge lobe, with a thread permitting the screw shank to be screwed into the lower hinge lobe, and comprising a sleeve that surrounds the screw shank, has elastic properties, and interacts with the upper and middle hinge lobes when the screw is in a screwed-in state, whereby the diameter of the second through opening is less than or equal to the diameter of the first through opening, and the screw has at least one bearing surface for the sleeve with at least one engaging surface that is aligned in the direction of movement in which the screw is unscrewed, the improvement comprising:

the screw shank having an annular collar that, in the screwed-in state. is situated in the middle hinge lobe.

16. (New) The screw connection according to Claim 15, wherein the screw shank is provided with at least one annular groove.

17. (New) The screw connection according to claim 16, wherein the sleeve engages a longitudinal section.

18. (New) The screw connection according to Claim 15, wherein the screw shank has at least one bridge.

19. (New) The screw connection according to claim 18, wherein the bridge has a circumferential design and is at least partially enclosed by the sleeve.

20. (New) The screw connection according to claim 15, wherein the annular collar acts as a guide collar.

21. (New) The screw connection according to claim 15, wherein sleeve, when viewed crosswise to the longitudinal extension of the screw, is disposed so as to project at least partially over the annular collar.

22. (New) The screw connection according to claim 15, wherein the diameter of the screw shank in the region of the annular groove is less than the diameter of the second through opening.

23. (New) The screw connection according to claim 15, wherein in the circumferential surface of the first through opening is provided at least one longitudinal groove, running parallel or essentially parallel to the direction of movement in which the screw is screwed and unscrewed and protecting the sleeve from twisting.

24. (New) The screw connection according to Claim 23, wherein at least two longitudinal grooves of preferably the same size are introduced in the circumferential surface of the first through opening , and that the wall segments of the circumferential surface situated between the longitudinal grooves preferably are essentially the same size as the longitudinal grooves.

25. (New) The screw connection according to claim 15 wherein the sleeve on its end opposite from the annular collar is constructed to be supported directly on the underside of the screw head or on a cylindrical projection.

26. (New) The screw connection according to claim 25, wherein the diameter of the screw head or the diameter of the projection is less than the diameter of the first through opening.

27. (New) The screw connection according to claim 15, wherein the sleeve in the screwed-in state is deformed in such a way that the sleeve material is pressed into the annular space formed between the screw shank and the second through opening.

28. (New) The screw connection according to claim 27, wherein the sleeve material is pressed into the gap between the screw head and the projection.

29. (New) The screw connection according to claim 27, wherein the sleeve material is pressed into at least one longitudinal groove.

30. (New) The screw connection according to claim 15, wherein the sleeve has an annular-shaped cross section, and at the end thereof facing toward the screw head optionally has a section that conically tapers in the direction of the thread.

31. (New) The screw connection according to claim 15, wherein the sleeve on its end facing toward the thread is provided with at least one recess for accepting the wall segment.

32. (New) The screw connection according to claim 15, wherein the second through opening has an annular-shaped cross section.

33. (New) The screw connection according to claim 32, wherein the opening of the second through opening that faces toward the screw head is conically tapered.

34. (New) A screw connection for at least two hinge parts, comprising:

at least two hinge parts which engage one inside the other and have an upper hinge lobe with a first through opening , a lower hinge lobe, and at least one middle hinge lobe having a second through opening, each of the through openings having a diameter and the diameter of the second through opening being less than or equal to the diameter of the first through opening,;

a screw configured for interconnecting the at least two hinge parts, said screw having a screw head and a screw shank that extends through the first through opening in the upper hinge lobe and extends through the second through opening in the middle hinge lobe, with a thread permitting the screw shank to be screwed into the lower hinge lobe, the screw having a screwed in state, and the screw having at least one bearing surface for the sleeve with at least one engaging surface that is aligned in the direction of movement in which the screw is unscrewed, the screw shank having an annular collar that, in the screwed-in state. is situated in the middle hinge lobe; and

a sleeve that surrounds the screw shank having elastic properties, and interacting with the upper and middle hinge lobes when the screw is in the screwed-in state.

35. (New) The screw connection according to Claim 34, wherein the screw shank is provided with at least one annular groove.

36. (New) The screw connection according to claim 34, wherein the sleeve engages a longitudinal section.

37. (New) The screw connection according to Claim 34, wherein the screw shank has at least one bridge.

38. (New) The screw connection according to claim 37, wherein the bridge has a circumferential design and is at least partially enclosed by the sleeve.

39. (New) The screw connection according to claim 34, wherein the annular collar acts as a guide collar.

40. (New) The screw connection according to claim 34, wherein sleeve, when viewed crosswise to the longitudinal extension of the screw, is disposed so as to project at least partially over the annular collar.

41. (New) The screw connection according to claim 34, wherein the diameter of the screw shank in the region of the annular groove is less than the diameter of the second through opening.

42. (New) The screw connection according to claim 34, wherein in the circumferential surface of the first through opening is provided at least one longitudinal groove, running parallel or essentially parallel to the direction of movement in which the screw is screwed and unscrewed and protecting the sleeve from twisting.

43. (New) The screw connection according to Claim 42, wherein at least two longitudinal grooves of preferably the same size are introduced in the circumferential surface of the first through opening , and that the wall segments of the circumferential surface situated between the longitudinal grooves preferably are essentially the same size as the longitudinal grooves.

44. (New) The screw connection according to claim 34 wherein the sleeve on its end opposite from the annular collar is constructed to be supported directly on the underside of the screw head or on a cylindrical projection.

45. (New) The screw connection according to claim 34 wherein the diameter of the screw head or the diameter of the projection is less than the diameter of the first through opening.

46. (New) The screw connection according to claim 34, wherein the sleeve in the screwed-in state is deformed in such a way that the sleeve material is pressed into the annular space formed between the screw shank and the second through opening.

47. (New) The screw connection according to claim 46, wherein the sleeve material is pressed into the gap between the screw head and the projection.

48. (New) The screw connection according to claim 46, wherein the sleeve material is pressed into at least one longitudinal groove.

49. (New) The screw connection according to claim 34, wherein the sleeve has an annular-shaped cross section, and at the end thereof facing toward the screw head optionally has a section that conically tapers in the direction of the thread.

REMARKS

Applicant submits that the application is believed to be in condition for allowance. Should the Examiner believe that any adverse action is necessary, it is requested that he contact Randall B. Bateman at (801) 6685-2302 so that such matters may be resolved as expeditiously as possible.

Respectfully Submitted,

MORRISS, BATEMAN, O'BRYANT & COMPAGNI, PC

Randall B. Bateman
Reg. No. 37,774

5882 South 900 East, Suite 300
Salt Lake City, Utah 84121
Telephone (801) 685-2302
E-mail: bateman@mboclaw.com

15. (New) A screw connection for at least two hinge parts, comprising a screw configured for interconnecting the at least two hinge parts, wherein the hinge parts engage one inside the other and have an upper hinge lobe, a lower hinge lobe, and at least one middle hinge lobe, said screw having a screw head and a screw shank that extends through a first through opening in the upper hinge lobe and extends through a second through opening in the middle hinge lobe, with a thread permitting the screw shank to be screwed into the lower hinge lobe, and comprising a sleeve that surrounds the screw shank, has elastic properties, and interacts with the upper and middle hinge lobes when the screw is in a screwed-in state, whereby the diameter of the second through opening is less than or equal to the diameter of the first through opening, and the screw has at least one bearing surface for the sleeve with at least one engaging surface that is aligned in the direction of movement in which the screw is unscrewed, the improvement comprising:

the screw shank having an annular collar that, in the screwed-in state. is situated in the middle hinge lobe.

16. (New) The screw connection according to Claim 15, wherein the screw shank is provided with at least one annular groove.

17. (New) The screw connection according to claim 16, wherein the sleeve engages a longitudinal section.

18. (New) The screw connection according to Claim 15, wherein the screw shank has at least one bridge.

19. (New) The screw connection according to claim 18, wherein the bridge has a circumferential design and is at least partially enclosed by the sleeve.

20. (New) The screw connection according to claim 15, wherein the annular collar acts as a guide collar.

21. (New) The screw connection according to claim 15, wherein sleeve, when viewed crosswise to the longitudinal extension of the screw, is disposed so as to project at least partially over the annular collar.

22. (New) The screw connection according to claim 15, wherein the diameter of the screw shank in the region of the annular groove is less than the diameter of the second through opening.

23. (New) The screw connection according to claim 15, wherein in the circumferential surface of the first through opening is provided at least one longitudinal groove, running parallel or essentially parallel to the direction of movement in which the screw is screwed and unscrewed and protecting the sleeve from twisting.

24. (New) The screw connection according to Claim 23, wherein at least two longitudinal grooves of preferably the same size are introduced in the circumferential surface of the first through opening , and that the wall segments of the circumferential surface situated between the longitudinal grooves preferably are essentially the same size as the longitudinal grooves.

25. (New) The screw connection according to claim 15 wherein the sleeve on its end opposite from the annular collar is constructed to be supported directly on the underside of the screw head or on a cylindrical projection.

26. (New) The screw connection according to claim 25, wherein the diameter of the screw head or the diameter of the projection is less than the diameter of the first through opening.

27. (New) The screw connection according to claim 15, wherein the sleeve in the screwed-in state is deformed in such a way that the sleeve material is pressed into the annular space formed between the screw shank and the second through opening.

28. (New) The screw connection according to claim 27, wherein the sleeve material is pressed into the gap between the screw head and the projection.

29. (New) The screw connection according to claim 27, wherein the sleeve material is pressed into at least one longitudinal groove.

30. (New) The screw connection according to claim 15, wherein the sleeve has an annular-shaped cross section, and at the end thereof facing toward the screw head optionally has a section that conically tapers in the direction of the thread.

31. (New) The screw connection according to claim 15, wherein the sleeve on its end facing toward the thread is provided with at least one recess for accepting the wall segment.

32. (New) The screw connection according to claim 15, wherein the second through opening has an annular-shaped cross section.

33. (New) The screw connection according to claim 32, wherein the opening of the second through opening that faces toward the screw head is conically tapered.

34. (New) A screw connection for at least two hinge parts, comprising:

at least two hinge parts which engage one inside the other and have an upper hinge lobe with a first through opening , a lower hinge lobe, and at least one middle hinge lobe having a second through opening, each of the through openings having a diameter and the diameter of the second through opening being less than or equal to the diameter of the first through opening,;

a screw configured for interconnecting the at least two hinge parts, said screw having a screw head and a screw shank that extends through the first through opening in the upper hinge lobe and extends through the second through opening in the middle hinge lobe, with a thread permitting the screw shank to be screwed into the lower hinge lobe, the screw having a screwed in state, and the screw having at least one bearing surface for the sleeve with at least one engaging surface that is aligned in the direction of movement in which the screw is unscrewed, the screw shank having an annular collar that, in the screwed-in state. is situated in the middle hinge lobe; and

a sleeve that surrounds the screw shank having elastic properties, and interacting with the upper and middle hinge lobes when the screw is in the screwed-in state.

35. (New) The screw connection according to Claim 34, wherein the screw shank is provided with at least one annular groove.

36. (New) The screw connection according to claim 34, wherein the sleeve engages a longitudinal section.

37. (New) The screw connection according to Claim 34, wherein the screw shank has at least one bridge.

38. (New) The screw connection according to claim 37, wherein the bridge has a circumferential design and is at least partially enclosed by the sleeve.

39. (New) The screw connection according to claim 34, wherein the annular collar acts as a guide collar.

40. (New) The screw connection according to claim 34, wherein sleeve, when viewed crosswise to the longitudinal extension of the screw, is disposed so as to project at least partially over the annular collar.

41. (New) The screw connection according to claim 34, wherein the diameter of the screw shank in the region of the annular groove is less than the diameter of the second through opening.

42. (New) The screw connection according to claim 34, wherein in the circumferential surface of the first through opening is provided at least one longitudinal groove, running parallel or essentially parallel to the direction of movement in which the screw is screwed and unscrewed and protecting the sleeve from twisting.

43. (New) The screw connection according to Claim 42, wherein at least two longitudinal grooves of preferably the same size are introduced in the circumferential surface of the first through opening , and that the wall segments of the circumferential surface situated between the longitudinal grooves preferably are essentially the same size as the longitudinal grooves.

44. (New) The screw connection according to claim 34 wherein the sleeve on its end opposite from the annular collar is constructed to be supported directly on the underside of the screw head or on a cylindrical projection.

45. (New) The screw connection according to claim 34 wherein the diameter of the screw head or the diameter of the projection is less than the diameter of the first through opening.

46. (New) The screw connection according to claim 34, wherein the sleeve in the screwed-in state is deformed in such a way that the sleeve material is pressed into the annular space formed between the screw shank and the second through opening.

47. (New) The screw connection according to claim 46, wherein the sleeve material is pressed into the gap between the screw head and the projection.

48. (New) The screw connection according to claim 46, wherein the sleeve material is pressed into at least one longitudinal groove.

49. (New) The screw connection according to claim 34, wherein the sleeve has an annular-shaped cross section, and at the end thereof facing toward the screw head optionally has a section that conically tapers in the direction of the thread.

Gleiss & Große

Patent Agents
Munich

Attorneys-at-Law
Stuttgart

Dr. jur. Alf-Olav Gleiss, Dipl.-Ing. PA
Rainer Große, Dipl.-Biol. PA
Dr. Andreas Schrell, Dipl.-Ing. PA
Torsten Armin Krüger RA
Nils Heide RA

D-70469 STUTTGART
MAYBACHSTRASSE 6A
Telephone: +49(0)711 81 45 55
Telefax: +49(0)711 81 30 32
Telex: 72 27 72 jura d
e-mail: jurapat@aol.com

PA: Patent Agent
European Patent Attorney
European Trademark Attorney

RA: Patent Agent, Attorney-at-Law

D-80469 MUNICH
MORASSISTRASSE 20
Telephone: +49(0)89 21578080
Telefax: +49(0)89 21578090
e-mail: G[illegible]pat@aol.com

In cooperation with
Shanghai Hua Dong Patent Agency
Shanghai, China

Patent Application

Screw Connection for Hinge Parts

OBE Ohnmacht & Baumgärtner
Gmbh & Co. KG
Turnstraße 22

75228 ISPRINGEN

SCREW CONNECTION FOR HINGE PARTS

Description

The invention relates to a screw connection for hinge parts, especially of an eyeglass frame, according to the preamble of Claim 1.

DE-AS 11 96 397 describes a screw connection of the type discussed herein that comprises a screw for connecting two hinge parts. The screw extends through a cylindrical through opening in an upper hinge lobe and extends through a conically tapered through opening in a middle hinge lobe, and a thread permits the screw to be screwed into a lower hinge lobe. The shank of the screw is surrounded by a plastic sleeve that is compressed when the screw is screwed in the axial direction, whereby the sleeve is pressed against the wall of the through opening in the middle hinge lobe and allows the action to be regulated. A disadvantage of this design is that a large material volume is necessary, resulting in a large outer diameter for the sleeve. Miniaturization, which is frequently required, is therefore not possible because of the large diameter of the hinge eyes. It has been shown that when the screw is unscrewed, the sleeve that is pressed into the through openings of the upper and middle hinge lobes remains therein and must be removed with a special tool.

As a result, the sleeve cannot be reused and must be replaced each time the hinge parts are disassembled.

DE-AS 11 17 911 describes an articulated connection comprising a screw that has a screw head, a hinge pin, and a thread. The screw has a sleeve made of injection-molded plastic that creates a soft action for the hinge parts. When the screw is screwed in, the sleeve, which has an overall length that is greater than the height of the associated holes in the hinge lobes, is compressed in the longitudinal direction, whereby the sleeve material is pressed against the hole surfaces and is pushed into the thread of the screw and squeezed into same. Because the sleeve extends into the threads, resulting in high tolerances, the quality of the screw is not reproducible. The screw has the additional disadvantage that during disassembly the screw is screwed out of the sleeve, and the sleeve that has been squeezed into the holes of the hinge lobes must be meticulously removed by the use of tools. The screw therefore cannot be reused.

Furthermore, DE-AS 12 24 058 describes a screw connection comprising a screw surrounded by a plastic sleeve, whereby the through hole introduced in the middle hinge lobe has a larger diameter on its opening that faces toward the upper hinge lobe than the through hole in the upper hinge lobe, so that in its screwed-in

state, the sleeve is compressed enough to form a rear engagement. Here as well, the sleeve must be removed from the hole during disassembly of the hinge parts using a tool. Consequently, the sleeve must be replaced with each disassembly. An additional disadvantage is that the through holes in the hinge parts are bored separately and optionally must be provided with a thread, resulting in high production costs for the screw connection.

The object of the invention, therefore, is to provide a screw connection of the type described herein, having a simple and economical design as well as high functional reliability. A further object is that the screw and the sleeve can be reused several times and assure simple disassembly of the hinge parts.

The object is achieved by a screw connection having the features of Claim 1. Said screw connection comprises a screw with a threaded screw shank that is surrounded by a sleeve having elastic properties. The sleeve preferably is made of an elastic material such as plastic. In the assembled state, the screw extends with its shank through a first through opening in an upper hinge lobe and through a second through opening in a middle hinge lobe, and is screwed to a lower hinge lobe. As a result, the diameter of the second through opening is less than or equal to

the diameter of the first through opening. The screw connection is characterized in that the screw has at least one bearing surface for the sleeve with at least one engaging surface that is aligned in the direction of movement in which the screw is unscrewed. In the context of the present invention, the term "bearing surface" is understood to mean the surface region of the screw on which the sleeve is mounted, for example by injection molding, and which the sleeve at least contacts or adjoins. The term "engaging surface" is understood to mean the region of the bearing surface on which the sleeve rests when the screw connection is loosened, the sleeve thereby being displaced together with the screw in the direction of movement in which the screw is unscrewed and pressed out of the through openings in the hinge lobes. The engaging surface is inclined toward the direction of movement in which the screw is unscrewed at such an angle that during unscrewing, at least one force component acts upon the sleeve in the direction of movement in which the screw is unscrewed, thereby enabling the sleeve to be displaced within the through openings. The sleeve that is mounted on the screw remains thereon, even when the screw connection is loosened. The screw connection may be loosened in a simple manner by the fact that the screw and the sleeve form a quasi-one-piece or one-part functional part. An additional advantage is that the screw with its sleeve is reusable, so that even with multiple screwing and unscrewing actions of the screw it is possible to precisely regulate the action of the hinge. Furthermore, the sleeve

protects the screw from loosening on its own.

Because of the different diameters of the first and second through openings, said through openings can be produced together; that is, the through openings are introduced, by boring, for example, into the hinge parts that engage one inside the other. Thus, the lower hinge lobe as well can be provided with a thread. The production of through openings in the hinge lobes for hinge parts placed one inside the other makes it possible to achieve very small tolerances. In another embodiment of the screw connection, the hinge parts are produced separately, for example by the use of MIM (metal injection molding) technology, which allows high precision in the shape and dimension of the parts.

In a preferred exemplary embodiment, the screw connection is provided in the screw shank with at least one annular groove, which preferably is circumferential, in which the sleeve is arranged or in which the sleeve engages with a longitudinal section. In a first variant of the embodiment, the length of the sleeve and the width of the annular groove measured crosswise to the longitudinal extension of the screw are equal or essentially equal, with the result that the sleeve is situated completely in the annular groove. The engaging surface here is formed, for example, by an annular collar on the screw shank formed by the annular groove. In the other variant of the embodiment, the sleeve is mounted on the screw in the region of the annular groove

such that a longitudinal section on the inner diameter of the sleeve engages in the annular groove and fills same at least partially, preferably completely. In this embodiment the width of the annular groove is smaller than the length of the sleeve, whereby the engaging surface for the sleeve, which is aligned in the direction of movement in which the screw is unscrewed, is formed by the side wall of the annular groove that is nearer to the screw thread. The engaging surface can be the same size in both variants of the embodiment, since the size thereof depends not on the width of the annular groove, but on its depth, among other factors.

Also preferred is an exemplary embodiment of the screw connection, characterized in that the screw shank has at least one bridge, preferably circumferential, which is at least partially enclosed by the sleeve. The bridge, which preferably is connected as one piece to the screw shank, projects in a radial direction beyond the screw shank, whereby the side wall of the bridge that faces toward the screw head has the engaging surface for supporting the sleeve when the screw is unscrewed.

All the exemplary embodiments of the screw connection have the common feature that when the screw connection is loosened, displacement forces can be applied to the sleeve over the engaging surface in a direction parallel to the longitudinal extension of the screw, with the result that the screw pushes the sleeve out of the through openings of the hinge lobes, as seen in the direction of movement in which the screw is unscrewed.

According to a development of the invention, the screw shank has an annular collar that in the screwed-in state is situated in the middle hinge lobe. In an advantageous embodiment, the annular collar serves as a guide collar and has a diameter that is slightly less than or equal to the diameter of the second through opening in the middle hinge lobe. Preferably, the play between the guide collar and the second through opening is only very slight. In this embodiment, the guide collar is led very precisely into the second through opening, thus assuring that the screw cannot tilt when force is applied to the hinge parts such that a shearing effect is exerted on the screw. As a result, the sleeve, which in the screwed-in state is deformed and which exerts pressure forces on the upper and middle hinge lobes, may be damaged. The screw is thus reliably prevented from coming unscrewed on its own and an action once regulated will not become softer over time and require readjustment. In the screwed-in state the guide collar preferably is situated in the center of the second through opening, thereby assuring optimal support and protection against tilting of the screw, even when force impinges on the hinge parts. Moreover, damage to the second through opening in its edge regions can be eliminated, even for large forces acting on the hinge parts.

Also preferred is an exemplary embodiment of the screw connection, characterized in that the diameter of the screw shank in the region of the annular groove is less than the diameter of the second through opening. In the screwed-in state, the part of the screw shank having the annular groove extends into the second through opening of the middle hinge lobe, so that the sleeve, which is compressed during a screwing action in the direction of its longitudinal central axis, is squeezed together in such a way that the compressed sleeve material is pressed in the axial direction into the annular space formed between the circumferential surface of the second through opening and the part of the screw shank having the annular groove, and fills this annular space at least partially, preferably completely, and the compressed sleeve material is also pressed crosswise to the direction of movement in which the screw is screwed in, into the annular space formed between the circumferential surface of the first through opening in the upper hinge lobe and the screw shank and, optionally, by the underside of the screw head, whereby this annular space is likewise filled at least partially by the sleeve material. The compressed sleeve presses over at least a portion of the circumferential surface up to a partial height of the first and second through openings and—as seen in the direction of movement in which the screw is screwed in—on the upper side of the middle hinge lobe. Varying the pressure forces acting on the middle hinge lobe by screwing in more tightly or partially unscrewing the screw allows the action of the hinge parts to be regulated and precisely adjusted.

An exemplary embodiment of the screw connection is also preferred in which a longitudinal groove is provided in the circumferential surface of the first through opening, running parallel or essentially parallel to the direction of movement in which the screw is screwed and unscrewed and protecting the sleeve from twisting about its longitudinal central axis. When the screw is being screwed in, the sleeve material is pushed into the longitudinal groove, preferably over a certain partial height of the longitudinal groove. In this manner a positive fit between the sleeve and the upper hinge lobe is achieved that prevents the sleeve from rotating with the screw when the screw connection is loosened. When the screw is unscrewed, the sleeve therefore does not rotate with the screw, but instead is displaced only in the direction of movement in which the screw is unscrewed on account of the sleeve being supported by the engaging surface of the bearing surface. Relative rotational motion between the screw and the sleeve occurs during the unscrewing action. In a further embodiment, many longitudinal grooves with small spacings between each are introduced in the circumferential surface of the first through opening, with said longitudinal grooves being formed by a knurl, for example.

The longitudinal groove(s) for hinge parts placed one inside the other can be produced preferably without cutting, for example by punching, stamping, or the like. In another variant of the embodiment of the screw connection, the hinge parts are produced individually, preferably by the use of MIM technology, which assures high precision of the parts.

The hinge parts produced by sintering are fabricated separately. It has been shown that in particular the variant of the embodiment of the screw connection in which the circumferential surface of the first through opening in the upper hinge lobe is provided with a knurl can be advantageously produced by MIM technology.

In an advantageous embodiment of the screw connection, the outer diameter of the sleeve is slightly less than or equal to the diameter of the first through opening, so that the torque required for screwing in is relatively small. Setting of the screw is simplified as well. It is understood that in another exemplary embodiment, the outer diameter of the sleeve can also be greater or significantly less than the diameter of the first through opening. The sleeve, which is produced from an elastic material such as plastic, can have a wide variety of shapes. In an advantageous exemplary embodiment, the sleeve has a circular or annular-shaped cross section. Of course, sleeves having a polygonal cross section, for example a square cross section, may also be used. When the screw is being screwed in, it is important that that the sleeve can be deformed at least enough so that the sleeve material flows into the through opening in the middle hinge lobe and optionally into at least one longitudinal groove in the circumferential surface of the first through opening, and that the sleeve material presses against at least a portion of the circumferential surface of the through

opening in the upper hinge lobe and optionally the upper side of the middle hinge lobe.

Further advantageous embodiments of the screw connection result from the remaining subclaims.

The invention is explained in more detail below with reference to the drawings, which show the following:

Figures 1A through 1D	a total of three cross sections and one top view of a first exemplary embodiment of a screw connection for hinge parts;
Figures 2A through 2D	a total of three cross sections and one top view of a second exemplary embodiment of the screw connection;
Figures 3A through 3D	for each figure, a view of a third exemplary embodiment of the screw connection;
Figures 4A through 4B	for each figure, a view of a fourth exemplary embodiment of the screw connection;
Figures 5A and 5B	a top view and a cross section of a fifth exemplary embodiment of the screw connection;
Figure 6	a cross section through a sixth exemplary embodiment of the screw connection;

Figures 7 through 10B	four exemplary embodiments of a screw; and
Figures 11a through 11c	a cross section, a top view, and a cutaway view of a seventh exemplary embodiment of the screw connection, in enlarged scale.

Figure 1A shows a longitudinal section through a screw connection 1 for hinge parts, of an eyeglass frame, for example, that comprises a two-lobed hinge part 3 and a one-lobed hinge part 5 that are placed one inside the other. The two-lobed hinge part 3 is connected to the eyeglass frame, for example, and the one-lobed hinge part 5 is connected to a side piece, for example. The two-lobed hinge part 3 has an upper hinge lobe 7 and a lower hinge lobe 9, and the one-lobed hinge part 5 has a middle hinge lobe 11 that is arranged between the upper and lower hinge parts 7, 9, preferably with little play. A first through opening 13 is introduced in the upper hinge lobe 7, and a second through opening 15 is introduced in the middle hinge lobe 11, such that the longitudinal axes of said through openings align with one another. The through openings 13, 15 here are designed with an annular cross section. In another exemplary embodiment, said through openings can also have a polygonal cross section, for example a square cross section, or a circular cross section. The diameter D1 of the first through opening 13 is larger than the diameter D2 of the second through opening 15, thereby forming an annular bearing shoulder 17.

A through threaded hole 19 is introduced in the lower hinge lobe 9 in such a way that the longitudinal axis of the through threaded hole aligns with the longitudinal axes of the first and second through openings 13, 15. From the underside 21 of the two-lobed hinge part 3 in the region of the lower hinge lobe 9 a conically running projection 23 arises by which the depth of the threaded hole 19 is enlarged.

In this exemplary embodiment, a total of four longitudinal grooves 24 (Figure 1D) are introduced in the circumferential surface of the first through opening 13, running parallel to the longitudinal center axis of the through opening 13 and in this case having a wedge-shaped cross section. The longitudinal grooves 24 extend through the entire through opening 13. The following discussion will explain the function of the longitudinal grooves 24 in more detail.

The screw connection 1 also comprises a screw 25 that has a screw head 27 and a screw shank 29 that is provided with a thread. A circumferential annular groove 30 is introduced in the screw shank 29, thereby forming an annular collar 31 on the screw shank 29. As shown in Figure 1A, the annular groove 30 extends all the way to the underside of the screw head 27. The annular collar 31 is designed as a guide collar; that is, its diameter is essentially equal to or slightly less than the diameter D2 of the second through opening 15, as shown in Figure 1C, which represents the screw 25 in the screwed-in state. Furthermore, Figure 1C shows that the outer diameter of the

screw head 27 is less than the diameter D1 of the first through opening 13, whereby the screw head 27 is displaced when the screw is screwed into the first through opening 13, and is partially accepted by said through opening.

The difference in diameters of the screw shank 29 in the region of the annular groove 30 and of the annular collar 31 forms a circumferential engaging surface 32 having the shape of an annular ring, which in this exemplary embodiment runs crosswise to the direction of movement in which the screw 25 is screwed or unscrewed. The size of the flat engaging surface 32 depends on the difference in diameters of the screw shank 29 in the region of the annular groove 30 and of the annular collar 31. In the annular groove 30 of the screw shank 29 a sleeve 33 is arranged, preferably made of an elastic material, for example plastic, that has an annular-shaped cross section. At its one end, the sleeve 33 abuts the underside of the screw head 27, and at its other end rests against the engaging surface 32 that is aligned in the direction of movement in which the screw is unscrewed (arrow 36). The sleeve 33 may also be constructed to be long enough so as to be fixed between the screw head 27 and the engaging surface 32, thereby being impinged upon by forces aligned in the axial direction. At its end that faces toward the annular collar 31, the one-piece sleeve 33 has a conical taper 34 in the direction of the thread. In this embodiment the forces acting on the middle hinge lobe 11 increase gently as the screw is being screwed in. As a result of the

progressive increase in the pressure force acting on the side of the middle hinge lobe 11 that faces toward the sleeve 33, an unacceptably large deformation of the middle hinge lobe 11 can be avoided.

The length of the sleeve 33, which preferably is injection-molded onto the screw shank 29, here corresponds essentially to the distance between the underside of the screw head 27 and the annular collar 31. The sleeve 33 in the region of its longitudinal section having a circular cylindrical cross section has an outer diameter that in this preferred exemplary embodiment is slightly less than or equal to the diameter D1 of the first through opening 13. Hence, only a slight torque is required for screwing the screw 25 into the first thread of the threaded hole 19.

During the screwing action, the sleeve 33 is compressed in the axial direction and the sleeve material is pressed into the longitudinal grooves 24, with the result that the longitudinal grooves 24 are filled to a portion of their height, as shown in Figure 1C. Compression of the sleeve 33 in the axial direction of the longitudinal grooves 24 results in a positive fit, which protects the sleeve 33 from twisting about its longitudinal center axis. The anti-twist protection is still effective when, after the screw 25 has been screwed in, the screw connection 1 is fully loosened, or only the screw 25 is slightly loosened, for the regulation of action, for example.

The following discussion explains the function of the screw connection 1 in more detail. When the screw 25 is screwed into the threaded hole 19, the sleeve 33 enters the first through opening 13 in the upper hinge lobe 7. As a result of the small outer dimensions of the sleeve 33, practically no pressure forces act on the sleeve casing. Figure 1B shows the screw 25 in a position in which it is screwed so far into the threaded hole 19 that the sleeve 33, at its tapered end 34, abuts the bearing shoulder 17 that is formed by the differences in diameters of the through openings 11, 13. In this position the annular collar 31 is already situated in the second through opening 15 in the middle hinge lobe 11. Both hinge parts 3, 5 are thereby brought into exact alignment with one another before the sleeve 33 is compressed in the direction of its longitudinal center axis. With further screwing, the screw 25 goes from the position represented in Figure 1B to the position represented in Figure 1C, in which the screw head 27 is partially accepted by the first through opening 13 in the upper hinge lobe 7. The sleeve 33, which presses at its one end against the underside of the screw head 27 and at its other end against the bearing shoulder 17, is thereby squeezed together such that the sleeve material extending in the radial and the axial directions is pressed into the [word omission] between the circumferential surface of the second through opening 15 and the portion of the screw shank 29 that has the annular groove 30 that receives the sleeve 33, and said sleeve material completely fills this [word omission]. In addition, the sleeve 33 is pressed against the bearing shoulder 17 that is formed

by the stepped holes (through openings 13, 15) and thus against the upper side of the middle hinge lobe 11 and into the longitudinal grooves 24 in the first through opening 13 of the upper hinge lobe 7, as well as against the circumferential surface regions of the first through opening 13 that lie between the longitudinal grooves 24. Since the sleeve 33 is made of an easily deformable, elastic material, the screw head 27 is partially pressed into the sleeve 33 that rests on the bearing shoulder 17 and fills a portion of the first through opening 13. The sleeve 33 is thus deformed in such a way that the sleeve material flows into the annular space formed between the outer side of the screw head 27 and the circumferential surface of the first through opening 13. Furthermore, Figure 1C shows that in the screwed-in state, the annular collar 31 is situated approximately in the center of the middle hinge lobe 11, whereby external forces acting on the hinge parts 3, 5 pass into the annular collar 31 of the screw 25 and are absorbed by same, without tilting the screw 25.

The sleeve 33, which is moved during the screwing action in the direction of movement in which the screw is screwed, impinges on a circumferential surface region of the second through opening 15 and on a circumferential surface region of the first through opening 13 with pressure forces that in this exemplary embodiment run crosswise to the direction of the screwing action. Furthermore, forces that are aligned in the direction of movement in which the screw is screwed are applied to the upper side of the middle hinge lobe 11, via the bearing shoulder 17. The forces that are applied via

the sleeve 33 to the middle hinge lobe 11 in this case run perpendicular to one another and allow the action of the hinge parts to be regulated. The further the screw 25 is screwed in, the greater the forces become that act on the middle hinge lobe 11. When the screw is partially unscrewed, the forces are reduced, thereby providing a softer action. After the screw 25 has been screwed in, and the sleeve 33 has been deformed in the manner described above and has been squeezed into the various spaces formed between the hinge parts 3, 5 and the screw 25, the action can be precisely regulated by screwing or unscrewing the screw. In addition, compression of the sleeve 33 in the direction of its longitudinal center axis protects the screw 25 from loosening on its own. Regulation of action and protection of the screw are achieved by using the screw connection 1 described with reference to Figures 1A through 1D.

In the screwed-in state, the sleeve 33 always rotates along with the two-lobed hinge part 3 and the screw 25 on account of the positive fit (longitudinal grooves 24) between the sleeve 33 and the two-lobed hinge part 3. A further advantage of the screw connection 1 is that only very slight torque is transmitted to the screw 25 from the one-lobed hinge part 5. The screw connection 1 can also be used for very thin hinge parts with preferably thin hinge lobes.

When the screw connection 1 is loosened, the engaging surface 32 of the screw shank 29 acts as an abutment for the sleeve 33, which on account of the positive fit of same with the longitudinal grooves 24 is protected from twisting about its longitudinal center axis. The positive fit between the sleeve 33 and the longitudinal grooves 24 is generally maintained even after the screw 25 is loosened, since the sleeve is plastically, and thus irreversibly, deformed at least in sections the first time the screw 25 is completely screwed in. During the unscrewing action the sleeve 33, with its end that faces toward the screw head 27, is supported by the engaging surface 32 that is aligned in the direction of movement in which the screw 25 is unscrewed (arrow 36), so that the sleeve 33 is displaced in the direction of movement in which the screw 25 is unscrewed. As a result of the sleeve 33 being pressed out of the through openings of the hinge parts, aided by the engaging surface 32, the sleeve 33 is prevented from screwing into the thread of the screw 25.

In another exemplary embodiment of the screw connection 1, not shown in the figures, the sleeve 33 is only elastically deformed, so that after the screw is loosened the positive fit with the hinge part 3 is resumed.

Figures 2A through 2D each show a view of a further embodiment of the screw connection 1. Identical parts are denoted by the same reference numbers, so that in this respect reference is made to Figures 1A through 1D. The following discussion will focus only on the differences.

The screw 25 has on the underside 35 of its screw head 27 a cylindrical projection 37, the diameter of which in this case corresponds approximately to the outer diameter of the sleeve 33. The sleeve 33, which is arranged in the annular groove 30 introduced in the screw shank 29, is supported at its one end by the cylindrical projection 37 during the screwing action, and is supported at its other end by the engaging surface 32 of the annular collar 31 during the unscrewing action. In the fully screwed-in state (Figure 2C), the underside 35 of the screw head 27 lies against the upper side 39 of the two-lobed hinge 3 and the upper hinge lobe 7. To increase the pressure forces acting on the sleeve 33 while in this position in the direction of movement in which the screw is screwed or unscrewed, the upper hinge lobe 7 can be pressed in by the screw head 27 at least in the edge region of said upper hinge lobe by screwing the screw in further. The distance between the cylindrical projection 37 and the bearing shoulder 17 of the stepped hole can thus be reduced, thereby increasing the forces acting on the sleeve 33. The screw 25 represented in Figures 2A through 2C is used with thin-walled hinge parts, for example.

Figures 3A through 3D each show a view of a third exemplary embodiment of the screw connection 1, with the screw 25 being represented in the screwed-in state only in Figures 3C and 3D. Parts matching those described in the previous figures are denoted by the same reference numbers, so that in this respect reference is made to the preceding description.

Four longitudinal grooves 24, running parallel to the longitudinal center axis of the first through opening 13, are arranged in the circumferential surface of the first through opening 13 of the upper hinge lobe 7, said longitudinal grooves being introduced by an operating method without cutting, for example by punching or stamping, preferably with the hinge parts 3, 5 fitted together. As a result of the sectional deformation of the circumferential surface of the first through opening 13 by the upper side 39 of the hinge, at least one nib 41 running radially in the direction of the center of the through opening 13 is formed on the edge region of the through opening 13 that faces toward the middle hinge lobe 11. Preferably a plurality of nibs 41, which in this case lie on the bearing shoulder 17, is provided that act as catches with respect to the sleeve 33.

Figures 4A through 4D each show a view of a further exemplary embodiment of the screw connection 1. Identical parts are denoted by the same reference numbers, so that in this respect reference is made to the description for the preceding figures. In the first through opening 13 in the upper hinge lobe 7, the diameter of which is the same as the diameter of the second through opening 15 in the middle hinge lobe 11, is introduced an indentation 43, on the side that faces toward the middle hinge lobe 11, that extends to approximately the center of the upper hinge lobe 7. In addition, in this exemplary embodiment a total of three longitudinal grooves 24 are introduced in the circumferential surface of the first through opening 13, for

example by punching, which are designed as sectors of a circle, as seen in the top view (Figure 4B).

The three longitudinal grooves 24 running parallel to the direction of movement in which the screw is screwed or unscrewed are of equal size; that is, they extend over equal angular ranges of the through opening 13. The longitudinal grooves 24 have a star-shaped arrangement; that is, they are disposed over the circumference of the first through opening 13 at a spacing of 120_ from one another. The longitudinal grooves 24 form three wall segments 45 that are designed as sectors of a circle, as seen in the top view. It can be seen from Figure 4A that the upper side 47 of the wall segments 45 is inclined toward the direction of movement in which the screw is screwed or unscrewed. The angle of inclination here is approximately as large as the angle of the taper 34 of the sleeve 33, so that flat contact is made between the sleeve 33 and the wall segments 45 without any deformation of the sleeve 33 (Figure 4C). The number of longitudinal grooves 24, and thus the number of wall segments 45, can be varied, and in another exemplary embodiment can be two, or more than three, for example four, five, or six.

In the exemplary embodiment represented in Figures 4A through 4D, the sleeve 33 has on its end that faces toward the screw head 27 a region of larger diameter, said diameter being approximately equal to the diameter of the indentation 43 and that of the screw head 27. Adjoining the region of larger diameter is a region of smaller diameter, said diameter being slightly greater than the diameter

of the annular collar 31. When the screw 25 is screwed in, the sleeve 33 is supported at its end having the region of larger diameter by the underside of the screw head 27, and at its other end is pressed against the upper side 47 of the wall segments 45. The sleeve 33 is thereby compressed in such a way that the sleeve material is pressed from above, and thus in the axial direction, into the longitudinal grooves 24 to provide the sleeve 33 with anti-twist protection, and is pressed into the annular space formed between the circumferential surface of the second through opening 15 in the middle hinge lobe 11 and the screw shank 29. By virtue of the fact that the first and second through openings 13, 15 have equal diameters, forces are applied via the sleeve 33 to the upper side 39 of the middle hinge lobe 11 only in the region of the longitudinal grooves 45. Moreover, the sleeve material—as with all the other exemplary embodiments of the screw connection 1—is pressed against at least a portion of the circumferential surfaces of the through openings 13, 15.

The hinge parts 3, 5 of the screw connection 1 described with reference to Figures 4A through 4D have the advantage that conventional screws can be used, which is particularly advantageous for optometrists.

Figure 5A and 5B show a partial cutaway side view and a top view of a fifth exemplary embodiment of the screw connection 1, which is distinguished from the exemplary embodiment described with reference to Figures 1A through 1D solely by the fact that in the first through opening 13 in the

upper hinge lobe 7 are introduced a large number of longitudinal grooves 24 that run parallel to the direction of movement in which the screw is screwed and unscrewed. As a result of the very small intervals between the longitudinal grooves 24, a knurl 49 is formed into which the material of the sleeve 33, which is compressed to form a positive fit when the screw is screwed in, is pressed or flows. In a preferred exemplary embodiment, the hinge parts 3, 5 are produced using MIM technology.

Figure 6 shows a cross section through a sixth exemplary embodiment of the screw connection 1, comprising a three-lobed hinge part 51 and a two-lobed hinge part 53 that fit one inside the other and are connected by means of a screw 25. Identical parts are denoted by the same reference numbers, so that in this respect reference is made to the description for the preceding figures. Middle hinge lobes 11A, 11B, and 11C are arranged between the upper hinge lobe 7 and the lower hinge lobe 9. The annular collar 31, which preferably is designed as a guide collar, is positioned in all the middle hinge lobes 11A, 11B, and 11C when the screw 25 is completely or essentially completely screwed in, and has a corresponding length. Tilting of the screw 25 in the through openings of the hinge lobes is thereby prevented, so that when forces impinge on the hinge lobes 51, 53 these forces are not transmitted to the sleeve 33 of the screw 25, which otherwise could lead to damage

and impaired function of the sleeve 33.

Figure 7 shows a further exemplary embodiment of the screw 25 on which a sleeve 33 made of an elastic material is mounted. The screw shank 29 has a circumferential, annular-shaped bridge 55 that is completely surrounded by the sleeve 33. The sleeve 33, which conically tapers in the direction of the thread of the screw 25, partially covers the bearing surface of the annular collar 31, which in the screwed-in state of the screw 25 is situated in at least one middle hinge lobe. The engaging surface 32, which supports the sleeve 33 when the screw connection is loosened such that the sleeve 33 is pressed from the hinge lobes by the screw, in this case is formed on the upper side 56 of the annular-shaped bridge 55. The bridge 55 provides a relatively large support surface for the sleeve 33, and also assures a secure hold of the sleeve 33 on the screw shank 29. When the sleeve 33 is compressed as the screw 25 is screwed in, the underside 35 of the screw head 27 and the underside 57 of the bridge 55 each form an abutment against which the sleeve 33 is pressed.

Figure 8 shows a side view of a further exemplary embodiment of the screw 25, the screw shank 29 of which is provided with an annular groove 30 whose width—seen crosswise to the longitudinal extension of the screw 25—is less than the length of the sleeve 33. Said annular groove is provided on the screw shank 29 in such a way

that the annular groove 30 is filled by the sleeve material to form a positive fit. In the representation in Figure 8, the lower side wall 59 of the circumferential annular groove 30 forms the engaging surface 32 upon which the sleeve 33 is supported when the screw is unscrewed.

The exemplary embodiments of the screw 25 described with reference to Figures 7 and 8 can be employed in conjunction with the exemplary embodiments of the screw connection 1 described with reference to Figures 1 through 6 without the need to alter the hinge parts.

Figures 9A and 9B each show a view of a further exemplary embodiment of the screw 25 for the hinge parts 3, 5 represented in Figures 4A through 4D. The sleeve 33 mounted on the screw 25 has a plurality of recesses 61—in this exemplary embodiment a total of three recesses—that open toward the front face 63 of the sleeve 33 that faces toward the thread of the screw 25. The inner contour of the recesses 61 corresponds to the outer contour of the wall segments 45 in the upper hinge lobe 7 (Figures 4A through 4D), so that in the screwed-in state the wall segments 45 are situated in the recesses 61. In this exemplary embodiment, the sleeve 33 rotates along with the screw 25 at the beginning of the screwing action until the sleeve has been displaced far enough on the wall segments 45 in the through opening 13 in the upper hinge lobe 7 so that the wall segments 45 engage in the recesses 61 of the sleeve 33, thus

preventing the sleeve 33 from rotating further with the screw 25. The sleeve 33, which is protected from twisting by the wall segments 45, rests at its one end against the underside of the screw head 27 and, when the screw 25 is screwed in further, is displaced by the screw in the direction of movement in which the screw is screwed in. The sleeve 33 is thus placed, in effect, like a cap on the wall segments 45 in the upper hinge lobe 7, with the recesses 61 preferably being large enough that this placement occurs essentially force-free. The sleeve 33 is not compressed until it is displaced far enough over the wall segments 45 that said sleeve 33 is pressed against the bearing shoulder 17, for example, and is clamped between said bearing shoulder and the underside of the screw head. In this exemplary embodiment, it is particularly advantageous that only a very small force is needed to protect the sleeve 33 from twisting, since the sleeve material does not have to be pressed from above into the longitudinal grooves 24 in the circumferential surface of the first through opening 13, as is the case, for example, for the screw connection 1 described with reference to the preceding figures.

Figure 10A shows a further exemplary embodiment of the screw 25, namely a slug, that has no elastic sleeve 33. The screw 25 has a circumferential annular groove 30 that directly adjoins the underside 35 of the screw head 27. Figure 10B shows the screw 25 with an injection-molded sleeve 33. The sleeve 33 has a circular cylindrical design without tapering. The outer diameter of the sleeve 33 is

smaller than the outer diameter of the screw head 27, but larger than the diameter of the annular collar 31.

Figures 11A and 11B show a longitudinal section and a top view, respectively, of a further exemplary embodiment of the screw connection 1. Parts that have already been described with reference to the preceding figures are denoted by the same reference numbers, so that in this respect reference is made to Figures 1 through 10B. It can be seen that the upper hinge lobe 7 has four longitudinal grooves 24 that are introduced from the upper side 39 of the hinge into the circumferential surface of the first through opening 13, as in the exemplary embodiment of the screw connection 1 described with reference to Figures 3A through 3D. A nib 41, which functions as a catch, is thereby formed for each longitudinal groove by the displaced material of the upper hinge lobe 7 and respectively rests on the upper side of the middle hinge lobe 11. In addition, an indentation 43 is introduced from the upper side of the hinge part into the first through opening 13. The base of the indentation 43 is situated in approximately the center of the upper hinge lobe.

The second through opening 15 as well is provided with an indentation 43' in the middle hinge lobe 11, which is introduced in the upper side of the middle hinge lobe 11. The shape and depth of the indentation 43' are chosen such that no bearing shoulder seat is formed on the upper side of the one-lobed hinge part, despite the difference in diameters between the first and second through openings 13, 15. Instead, the bearing shoulder 17 runs

at an angle to an imaginary horizontal line, corresponding to the shape of the indentation 43'.

Figure 11C shows an enlarged section of the screw connection 1 described with reference to Figures 11A and 11B, in the assembled state; that is, the screw 25 is screwed into the threaded hole 19. The embodiment of the screw 25 corresponds to the exemplary embodiment of the screw 25 described with reference to Figures 10A and 10B. Figure 11C shows that when the screw 25 is screwed in, the sleeve 33 adjoining the threaded hole 19 at the indentations 43 and 43' as well as at the nibs 41 is squeezed together in such a way that the sleeve material is pressed into the longitudinal grooves 24 and into the gap between the screw 25 and the first and second through openings 13, 15 in the upper and middle hinge lobes 7, 11. In this case, the regulation for play-free movement of the hinge is performed at the surface of the indentation 43' that runs obliquely to the horizontal plane, and the screw 25 is protected from loosening on its own by the elastic forces of the sleeve 33, which is impinged upon in the axial direction by pressure forces, acting on the underside 35 of the screw head 27.

The screw 25 that is the object of the invention imparts a uniform, durable action to the hinges described above. It has been shown that the stability of the hinge action can be regulated and generally remains approximately the same, even after several thousand movements of the hinge.

It has been shown that only very minor spreading of the hinge action appears during automatic screwing of screw connection 1, which in an advantageous exemplary embodiment lies in the range of 5 Ncm. In an advantageous exemplary embodiment the smallest hinge action is approximately 2 Ncm, and the greatest hinge action is approximately 7 Ncm. It has been shown that the screw 25 according to the invention has a spreading of only about 2 Ncm to 3 Ncm for articulated joints with a loose fit, and only about 5 Ncm to 6 Ncm for articulated joints that are produced fitted together.

Furthermore, it has been found that in the screw connection 1 according to the invention the screw 25 cannot loosen on its own, and for example after 20,000 hinge movements still has a loosening torque of approximately 2 Ncm.

A clearance play of up to 0.06 mm can be compensated for by use of the screw 25 according to the invention,. A very good, precisely adjustable hinge action can thus be achieved, even for single piece production with a poor or inferior fit. The screw 25 according to the invention can also be readily used in plastic holders.

All of the exemplary embodiments of the screw connection 1 described with reference to the figures are characterized

in particular by high functional reliability, and assure protection from the screw connection loosening on its own, as well as regulation of the hinge action. Moreover, the screw and sleeve, connected together as one piece, can be reused numerous times. The screw connection explained in the figures is characterized in that a coupling is provided between the sleeve and the screw as seen in the axial direction, and thus in the direction of movement in which the screw is screwed or unscrewed. During screwing and unscrewing of the screw the sleeve is moved with the screw in the axial direction. The screw can rotate freely with reference to the sleeve, so that a relative rotational motion between the screw and the sleeve is possible, as described above. On the other hand, the specialized design of the through opening that accepts the screw, and in particular the sleeve, assures that the sleeve is prevented from twisting. The anti-twist protection is provided by longitudinal grooves, and optionally by additional, radially projecting nibs that engage from the outside into the sleeve material and prevent twisting of same. This design provides great security against inadvertent or unintended loosening of the screw.

Gleiss & Große
Patent Agents Attorneys-at-Law

PCT/EP00/06373 **June 18, 2001**
OBE Ohnmacht & Baumgärtner. **23446 WO GL-to-ho**

New Claims

1. Screw connection (1) for hinge parts (3, 5), especially of an eyeglass frame, comprising a screw (25) that interconnects the hinge parts that engage one inside the other and that have an upper hinge lobe, a lower hinge lobe, and at least one middle hinge lobe (7, 9, 11), said screw having a screw head (27) and a screw shank (29) that extends through a first through opening (13) in the upper hinge lobe (7) and extends through a second through opening (15) in the middle hinge lobe (11), with a thread permitting the screw shank to be screwed into the lower hinge lobe (9), and comprising a sleeve (33) that surrounds the screw shank (29), has elastic properties, and interacts with the upper and middle hinge lobes (7, 9) when the screw is in a screwed-in state, whereby the diameter (D2) of the second through opening (15) is less than or equal to the diameter (D1) of the first through opening (13), and the screw (25) has at least one bearing surface for the sleeve (33) with at least one engaging surface (32) that is aligned in the direction of movement in which the screw (25) is unscrewed, **characterized in that** the screw shank (29) has an annular collar (31) that in the screwed-in state is situated in the middle hinge lobe (11; 11A, 11B, 11C).

2. Screw connection according to Claim 1, **characterized in that** in the screw shank (29) is provided at least one annular groove (30), which preferably has a circumferential design, in which the sleeve (33) is arranged or in which the sleeve (33) engages with a longitudinal section.

3. Screw connection according to Claim 1 or 2, **characterized in that** the screw shank (29) has at least one bridge (55) which preferably has a circumferential design and which is at least partially enclosed by the sleeve (33).

4. Screw connection according to one of the preceding claims, **characterized in that** the annular collar (31) acts as a guide collar.

5. Screw connection according to one of the preceding claims, **characterized in that** the sleeve (33)—seen crosswise to the longitudinal extension of the screw (25)—is constructed so as to project at least partially over the annular collar (31).

6. Screw connection according to one of the preceding claims, **characterized in that** the diameter of the screw shank (29) in the region of the annular groove (30) is less than the diameter (D2) of the second through opening (15).

7. Screw connection according to one of the preceding claims, **characterized in that** in the circumferential surface of the first through opening (13) is provided at least one longitudinal groove (24), running parallel or essentially parallel to the direction of movement in which the screw (25)

is screwed and unscrewed and protecting the sleeve (33) from twisting.

8. Screw connection according to Claim 7, **characterized in that** at least two longitudinal grooves (24) of preferably the same size are introduced in the circumferential surface of the first through opening (13), and that the wall segments (45) of the circumferential surface (45) situated between the longitudinal grooves (24) preferably are essentially the same size as the longitudinal grooves (24).

9. Screw connection according to one of the preceding claims, **characterized in that** the sleeve (33) on its end opposite from the annular collar (31) is constructed to be supported directly on the underside (35) of the screw head (27) or on a cylindrical projection (37).

10. Screw connection according to one of the preceding claims, **characterized in that** the diameter of the screw head (27) or the diameter of the projection (37) is less than the diameter (D1) of the first through opening (13).

11. Screw connection according to one of the preceding claims, **characterized in that** the sleeve (33) in the screwed-in state is deformed in such a way that the sleeve material is pressed into the annular space formed between the screw shank (29) and the second through opening (15), and/or into the gap between the screw head (27) and the projection (37), and/or into at least one longitudinal groove (24).

12. Screw connection according to one of the preceding claims, characterized in that the sleeve (33) has an annular-shaped cross section, and at the end thereof facing toward the screw head (27) optionally has a section that conically tapers in the direction of the thread.

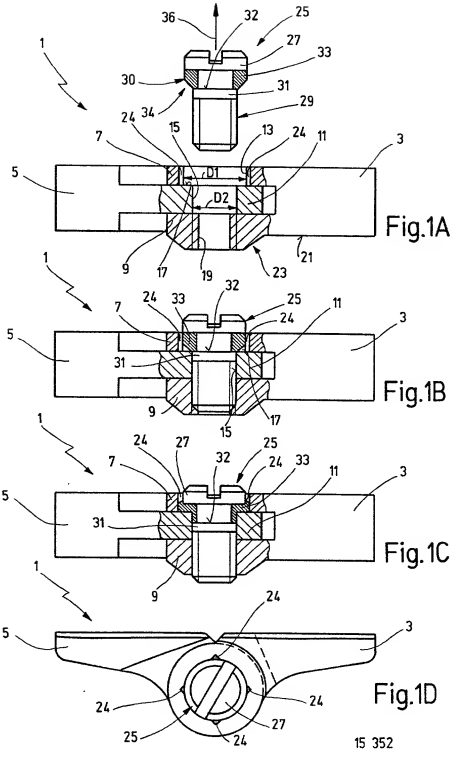
13. Screw connection according to one of the preceding claims, characterized in that the sleeve (33) on its end facing toward the thread is provided with at least one recess (61) for accepting the wall segment (45).

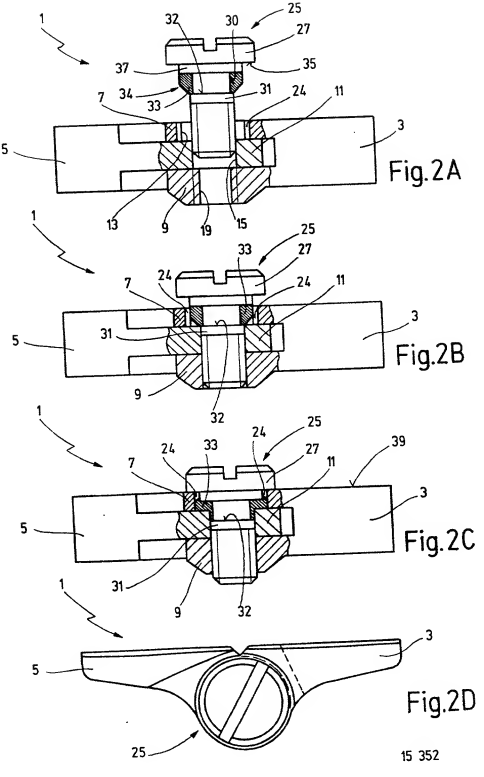
14. Screw connection according to one of the preceding claims, characterized in that the second through opening (15) has an annular-shaped cross section, and at the opening thereof that faces toward the screw head (27) optionally is conically tapered (recess 43').

Abstract

The invention relates to a screw connection for hinge parts, especially of an eyeglass frame, comprising a screw that interconnects the hinge parts that engage one inside the other and that have an upper hinge lobe, a lower hinge lobe, and at least one middle hinge lobe, said screw having a screw head and a screw shank that extends through a first through opening in the upper hinge lobe and extends through a second through opening in the middle hinge lobe, with a thread permitting the screw shank to be screwed into the lower hinge lobe, and comprising a sleeve that surrounds the screw shank, has elastic properties, and interacts with the upper and middle hinge lobes when the screw is in a screwed-in state, whereby the diameter (D2) of the second through opening is less than or equal to the diameter (D1) of the first through opening. The screw connection is distinguished by the fact that the screw (25) has at least one bearing surface for the sleeve (33) with at least one engaging surface (32) that is aligned in the direction of movement in which the screw (25) is unscrewed.

(Figure 1C)





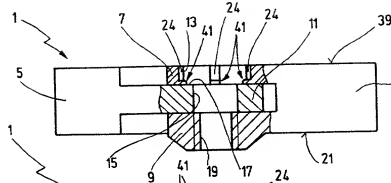


Fig.3A

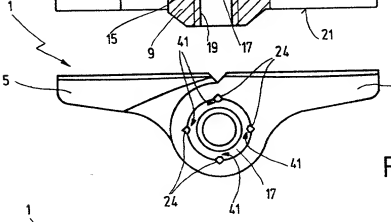


Fig. 3B

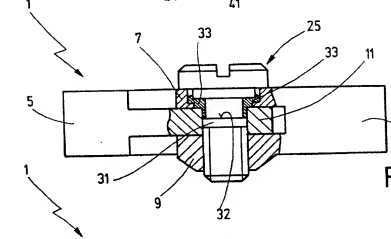


Fig.3C

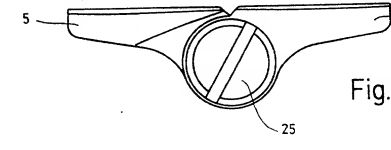
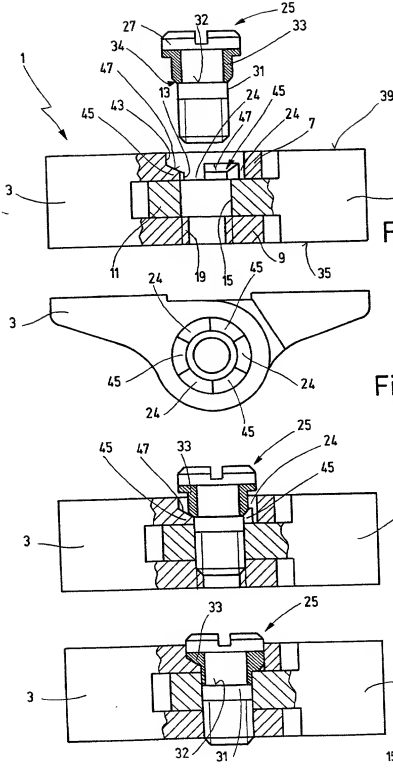


Fig.3D



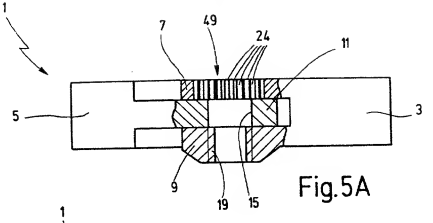


Fig.5A

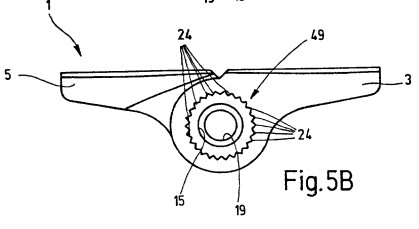


Fig.5B

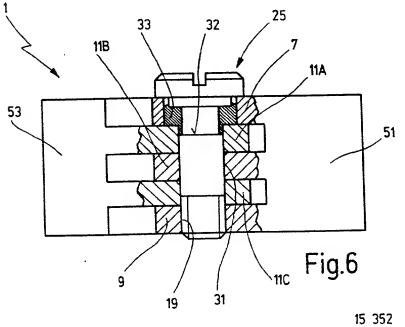


Fig.6

15 352

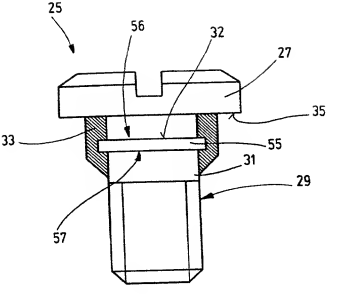


Fig.7

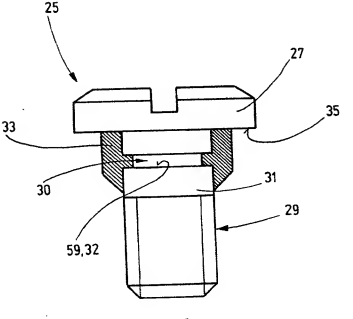


Fig.8

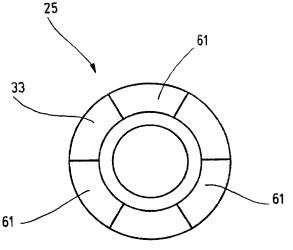


Fig.9A

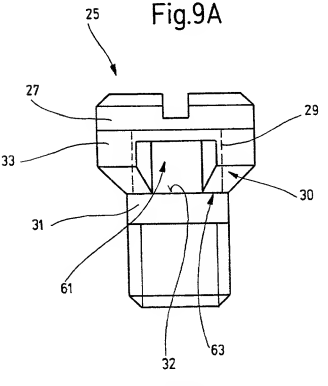


Fig.9B

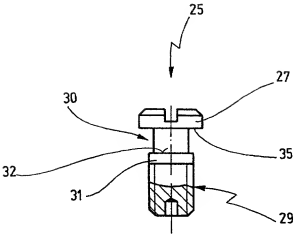


Fig.10A

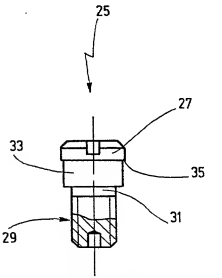


Fig.10B

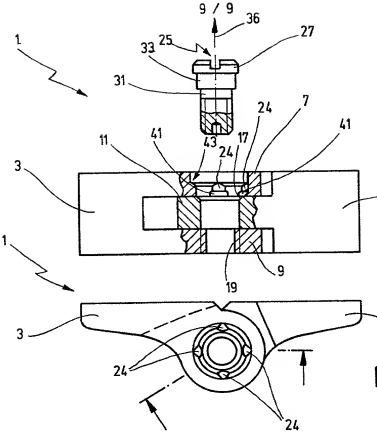


Fig.11A

Fig.11B

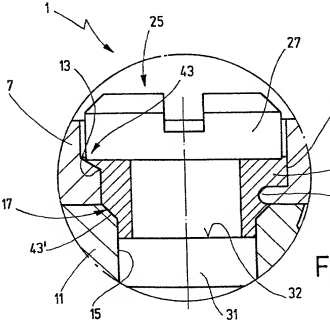


Fig.11C

23 446WO

German Language Declaration

VERTRETUNGSVOLMACHT: Als benannter Erfinder beauftrage ich hiermit den (die) nachstehend aufgeführten Patentanwalt (Patentanwälte) und/oder Vertreter mit der Verfolgung der vorliegenden Patentanmeldung sowie mit der Abwicklung aller damit verbundenen Angelegenheiten vor dem US-Patent- und Markenamt: *(Name(n) und Registrationsnummer(n) auflisten)*

Julie K. Morriss 33,263 Randall B. Bateman, 37,774
David W. O'Bryant 39,793 Frank W. Compagni, 40,567

MORRISS, BATEMAN, O'BRYANT & COMPAGNI
5882 South 900 East, Suite 300
Salt Lake City, Utah 84121

Postanschrift:

Randall B. Bateman (801) 685-2302

Telefonische Auskünfte: *(Name und Telefonnummer)*

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith: *(list name and registration number)*

Julie K. Morriss 33,263 Randall B. Bateman, 37,774
David W. O'Bryant 39,793 Frank W. Compagni 40,567

MORRISS, BATEMAN, O'BRYANT & COMPAGNI
5882 South 900 East, Suite 300
Salt Lake City, Utah 84121

Send Correspondence to

Randall B. Bateman (801) 685-2302

Direct Telephone Calls to *(name and telephone number)*

Vor-und Zuname des einzigen oder ersten Erfinders **Klaus Beck**	Full name of sole or first inventor **Klaus Beck**
Unterschrift des Erfinders Datum 18.03.02	Inventor's signature Date 18.03.02
Wohnsitz **Kämpfelbach, Germany** DEX	Residence **Kämpfelbach, Germany**
Staatsangehörigkeit **German**	Citizenship **German**
Postanschrift **Folenweg 8** **D-75326 Kämpfelbach** **Germany**	Post Office Address **Folenweg 8** **D-75326 Kämpfelbach** **Germany**
Vor-und Zuname des zweiten Miterfinders (falls zutreffend) **Rainer Wagner**	Full name of second joint inventor, if any **Rainer Wagner**
Unterschrift des zweiten Erfinders Datum 18.03.02	Second Inventor's signature Date 18.03.02
Wohnsitz **Ispringen, Germany** DEX	Residence **Ispringen, Germany**
Staatsangehörigkeit **German**	Citizenship **German**
Postanschrift **Turnstrasse 22a** **D-75228 Ispringen** **Germany**	Post Office Address **Turnstrasse 22a** **D-75228 Ispringen** **Germany**

German Language Declaration

Ich beanspruche hiermit ausländische Prioritätsvorteile gemäß Title 35, US-Code, § 119 (a)-(d), bzw. § 365 (b) aller unten aufgeführten Auslandsanmeldungen für Patente oder Erfinderurkunden, oder § 365(a) aller PCT internationalen Anmeldungen, welche wenigstens ein Land ausser den Vereinigten Staaten von Amerika benennen, und habe nachstehend durch ankreuzen sämtliche Auslands- anmeldungen für Patente bzw, Erfinderurkunden oder PCT internationale Anmeldungen angegeben, deren Anmeldetag dem der Anmeldung, für welche Priorität beansprucht wird, vorangeht.

I hereby claim foreign priority under Title 35, United States Code, § 119(a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Applications
(Frühere ausländische Anmeldungen)

(Number) (Nummer)	(Country) (Land)	Priority Not Claimed / Priorität nicht beansprucht
19931837.9	Germany	9 July 1999 (Day/Month/Year Filed) (Tag/Monat/Jahr der Anmeldung) ☐
(Number) (Nummer)	(Country) (Land)	(Day/Month/Year Filed) (Tag/Monat/Jahr der Anmeldung) ☐

Ich beanspruche hiermit Prioritätsvorteile unter Title 35, US-Code, § 119(e) aller US-Hilfsanmeldungen wie unten aufgezählt.

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below

(Application No.) (Aktenzeichen)	(Filing Date) (Anmeldetag)
(Application No.) (Aktenzeichen)	(Filing Date) (Anmeldetag)

Ich beanspruche hiermit die mir unter Title 35, US-Code, § 120 zustehenden Vorteile aller unten aufgeführten US-Patentanmeldungen bzw. § 365(c) aller PCT internationalen Anmeldungen, welche die Vereinigten Staaten von Amerika benennen, und erkenne, insofern der Gegenstand eines jeden früheren Anspruchs dieser Patentanmeldung nicht in einer US-Patentanmeldung, bzw. PCT internationalen Anmeldung in in einer gemäß dem ersten Absatz von Title 35, US-Code, § 112 vorgeschriebenen Art und Weise offenbart wurde, meine Pflicht zur Offenbarung jeglicher Information an, die zur Prüfung der Patentfähigkeit in Einklang mit Title 37, Code of Federal Regulations, § 1.56 von Belang sind und die im Zeitraum zwischen dem Anmeldetag der früheren Patentanmeldung und dem nationalen oder im Rahmen des Vertrags über die Zusammenarbeit auf dem Gebiet des Patentwesen (PCT) gültigen internationalen Anmeldetags bekannt geworden sind.

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s), or § 365(c) of any PCT International application designating the United States, listed below and , insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application.

(Application No.) (Aktenzeichen)	(Filing Date) (Anmeldetag)	(Status) (patented, pending, abandoned) (Status) (patentiert, schwebend, aufgegeben)
(Application No.) (Aktenzeichen)	(Filing Date) (Anmeldetag)	(Status) (patented, pending, abandoned) (Status) (patentiert, schwebend, aufgegeben)

Ich erkläre hiermit, daß alle in der vorliegenden Erklärung von mir gemachten Angaben nach bestem Wissen und Gewissen der Wahrheit entsprechen, und ferner daß ich diese eidesstattliche Erklärung in Kenntnis dessen ablege, daß wissentlich und vorsätzlich falsche Angaben oder dergleichen gemäß § 1001, Title 18 des US-Code strafbar sind und mit Geldstrafe und/oder Gefängnis bestraft werden können und daß derartige wissentlich und vorsätzlich falsche Angaben die Rechtswirksamkeit der vorliegenden Patentanmeldung oder eines aufgrund deren erteilten Patentes gefährden können.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

24268

U.S. Serial No. 10/048,330

Declaration and Power of Attorney for Patent Application
Erklärung für Patentanmeldungen mit Vollmacht

German Language Declaration

Als nachstehend benannter Erfinder erkläre ich hiermit an Eides Statt:

daß mein Wohnsitz, meine Postanschrift und meine Staatsangehörigkeit den im nachstehenden nach meinem Namen aufgeführten Angaben entsprechen, daß ich nach bestem Wissen der ursprüngliche, erste und alleinige Erfinder (falls nachstehend nur ein Name angegeben ist) oder ein ursprünglicher, erster und Miterfinder (falls nachstehend mehrere Namen aufgeführt sind) des Gegenstandes bin, für den dieser Antrag gestellt wird und für den ein Patent für die Erfindung mit folgendem Titel beantragt wird:

Screw Connection for Hinge Parts

deren Beschreibung hier beigefügt ist, es sei denn (in diesem Falle Zutreffendes bitte ankreuzen), diese Erfindung

☒ wurde angemeldet am 6 July 2000
unter der US-Anmeldenummer oder unter der internationalen Anmeldenummer im Rahmen des Vertrags über die Zusammenarbeit auf dem Gebiet des Patentwesens (PCT)
PCT/EP00/06373 und am
11 December 2001 abgeändert (falls zutreffend).

☐

☐

Ich bestätige hiermit, daß ich den Inhalt der oben angegebenen Patentanmeldung, einschließlich der Ansprüche, die etwtuell durch einen oben erwähnten Zusatzantrag abgeändert wurde, durchgesehen und verstanden habe.

Ich erkenne meine Pflicht zur Offenbarung jeglicher Informationen an, die zur Prüfung der Patentfähigkeit in Einklang mit Titel 37, Code of Federal Regulations, § 1.56 von Belang sind.

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

Screw Connection for Hinge Parts

the specification of which is attached hereto unless the following box is checked:

☒ was filed on 6 July 2000
as United States Application Number or PCT International Application Number
PCT/EP00/06373 and was amended on
11 December 2001 (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56.